

Claims

[c1] 1. A device for reducing the liquid content of a liquid and solid slurry, comprising:
(a) a dual-walled vertical tube wherein said dual wall is non-porous at the top of the vertical tube and porous at the bottom of the vertical tube;
(b) an endplate connected to the bottom of the vertical tube wherein such endplate has perforations; and,
(c) means for receiving or collecting slurry flowing from the endplate such that such slurry remains separate from a liquid passing through the porous segment of the dual-walled vertical tube.

[c2] 2. The device of claim 1 wherein the means for receiving or collecting slurry is a disposable vitrification canister.

[c3] 3. The device of claim 1 further comprising a means for directing the effluent flowing from the porous segment of the wall of the dual-walled vertical tube away from the "de-watered" slurry exiting the endplate.

[c4] 4. The device of claim 3 wherein the means for directing the effluent is a non-porous vertical tube surrounding the dual-walled vertical tube, such dual-walled vertical tube being connected to the endplate and being of such diameter as to create an annular space between the outer wall of the dual-walled vertical tube and the inner wall of the non-porous vertical tube, which annular space is sufficient to both channel an effluent entering at the bottom and exiting out the top of said annular space, and permit the backflow of a flushing liquid into the vertical tube through the porous segment of the wall.

[c5] 5. The device of claim 4 further comprising a means for cooling the slurry within the dual-walled vertical tube.

[c6] 6. The device of claim 5 wherein the means for cooling the slurry within the dual-walled vertical tube comprises,
(a) a first non-porous vertical tube connected to the endplate and surrounding the dual-walled vertical tube in such a manner as to create an annular space between the outer wall of the dual-walled vertical tube and the inner wall of the

first non-porous vertical tube; and

(b) a second non-porous vertical tube connected to the endplate and surrounding the first non-porous vertical tube in such a manner as to create an annular space between the outer wall of the first non-porous vertical tube and the inner wall of the second non-porous vertical tube, said annular space being divided into one inlet chamber and one outlet chamber, each such chamber having sufficient volume to permit introduction of a cooling fluid into the inlet chamber, and to allow said cooling fluid to flow to the bottom of said inlet chamber then into, up and out said outlet chamber while maintaining the temperature of the slurry in the dual walled vertical tube below the boiling point of said slurry.

[c7] 7. The device of claim 6 further comprising a means for adding a slurry into the dual-walled vertical tube.

[c8] 8. The device of claim 7 further comprising a means for connecting and disconnecting said dual-walled vertical tube to and from the means for adding a slurry into the dual-walled vertical tube.

[c9] 9. The device of claim 8 further comprising a means for closing the endplate to prevent flow out through the perforations in the endplate.

[c10] 10. The device of claim 9 further comprising a means for creating jets of a liquid and solid slurry exiting the dual-walled vertical tube through the endplate.

[c11] 11. The device of claim 10 further comprising a means for vibrating the endplate.

[c12] 12. The device of claim 1 further comprising a means for connecting and disconnecting the dual-walled vertical tube to and from the means for receiving or collecting slurry.

[c13] 13. The device of claim 1 further comprising a means for adding a slurry into the dual-walled vertical tube.

[c14] 14. The device of claim 1 further comprising a means for creating jets of a

liquid and solid slurry exiting the dual-walled vertical tube through the endplate.

- [c15] 15. The device of claim 1 further comprising a means for vibrating the endplate.
- [c16] 16. The device of claim 1 further comprising a means for closing the endplate to prevent flow out through the perforations in the endplate.
- [c17] 17. The process of reducing the liquid content of a liquid and solid slurry, comprising the steps for, adding a slurry of liquid and solids to the vertical tube of claim 1; and receiving or collecting slurry from the endplate such that such slurry remains separate from a liquid passing through the porous segment of the dual-walled vertical tube.
- [c18] 18. The process of reducing the liquid content of a liquid and solid slurry, comprising the steps for: adding a slurry of liquid and solids to the vertical tube of claim 2; and, receiving or collecting slurry from the endplate in the disposable vitrification canister
- [c19] 19. The process of reducing the liquid content of a liquid and solid slurry, comprising the steps for, adding a slurry of liquid and solids to the vertical tube of claim 11 and receiving or collecting slurry from the endplate such that such slurry remains separate from a liquid passing through the porous segment of the dual-walled vertical tube.
- [c20] 20. The process of claim 19 wherein the step for receiving or collecting slurry from the endplate is conducted using a disposable vitrification device as a receiving or collecting device.
- [c21] 21. The process of reducing the liquid content of a liquid and solid slurry using the vertical tube of claim 11 comprising,
 - (a) step for connecting the vertical tube to the receiving device;
 - (b) step for adding a slurry of liquid and solids to the vertical tube;
 - (c) step for receiving or collecting slurry flowing from the endplate such that such slurry remains separate from a liquid passing through the porous segment of the dual-walled vertical tube;

- (d) step for directing the effluent flowing from the porous segment of the wall of the dual-walled vertical tube away from the "de-watered" slurry exiting the endplate;
- (e) step for cooling the bottom of the dual-walled vertical tube;
- (f) step for creating jets of a liquid and solid slurry exiting the dual-walled vertical tube through the endplate;
- (g) step for vibrating the endplate;
- (h) step for backflowing a flushing liquid into the vertical tube;
- (i) step for stopping the flow of slurry into the vertical tube;
- (j) step for adding a flushing liquid to the dual-walled vertical tube;
- (k) step for closing the endplate; and,
- (l) step for disconnecting the vertical tube to the receiving device.